REMARKS

Claims 1-13 and 15-31 are pending in this application. By this Amendment, claim 14 is canceled and claims 22, 24 and 26 are amended. Reconsideration in view of the above amendments and the following remarks is respectfully requested.

Applicants gratefully acknowledge the courtesies extended by Examiner Harvey to Applicants' representative Mr. Wesolowski, during a September 25, 2002 personal interview. The substance of the personal interview is incorporated in the following remarks.

Entry of the amended claims is proper under 37 C.F.R. §1.116 since the amendments: (1) place the application in condition for allowance (for the reasons discussed herein); (2) do not raise any new issues requiring further search and/or consideration (since the amendments amplify issues previously discussed throughout prosecution without incorporating additional subject matter); and/or (3) place the application in better form for appeal (if necessary). Entry is thus requested.

A. The Office Action rejects claim 14 under 35 U.S.C. §112, second paragraph. Applicants respectfully submit the above amendments obviate the grounds for the rejection as claim 14 is canceled. Withdrawal of the rejection of claim 14 under 35 U.S.C. §112 is respectfully requested.

B. The Office Action rejects claims 1-8, 11-13, 16 and 18-31 under 35 U.S.C. §102(b) over U.S. Patent No. 5,571,148 to Loeb. The rejection is respectfully traversed.

1. With respect to claims 16 and 29, Applicants respectfully submit that Loeb fails to disclose every claimed feature as required under 35 U.S.C. §102. For example, Loeb fails to disclose at least transducer means for transforming the auditory signal and the pseudospontaneous driving signal to electrical input signals, and stimulation means for stimulating the auditory nerve at defined locations within the cochlea, wherein at least one of the plurality of electrical signals is capable of causing statistically independent activity in a plurality of nerve fibers of an auditory nerve as recited in claim 16.

Applicants define pseudospontaneous activity in at least page 14, lines 12-20; page 23, lines 13-14 and using Figures 4A-8D of the present specification. In contrast, electrical stimulation of the auditory nerve via cochlear implant has deficiencies with respect to acoustic hearing. See page 3, lines 7-18 of the present specification. In a normal cochlea, the inner hair cell-spiral ganglion is inherently "noisy." See page 14, lines 6-11 of the present specification. Applicants respectfully submit preferred embodiments according to the present invention can eliminate at least such a difference between acoustic and electrical hearing. See page 15, lines 5-13 and 15-17 of the present specification. Accordingly, Applicants respectfully submit that Loeb does not teach or suggest an electrical signal capable of causing statistically independent activity in a plurality of nerve fibers of an auditory nerve as recited in claim 16. For at least similar reasons, Applicants respectfully submit claim 29 defines patentable subject matter.

The Office Action asserts that in Item 4 "Response to Arguments" that Loeb discloses a recognized need in the art for electrically stimulating the auditory nerve of a profoundly deaf

person via the application of electrical pulses in the cochlea. The Office Action asserts Loeb's invention is primarily concerned with the generation of electrical signals to stimulate the auditory nerve. However, the Office Action asserts Loeb's invention discloses random patterns to stimulate the auditory nerve. Applicants disagree. In contrast, Applicants respectfully submit that Loeb discloses in column 1, line 27 to column 2, line 14, electrical signals to allow persons to experience the sensation of hearing.

Thus, Applicants respectfully submit Loeb discloses electrical signals representative of speech but does not teach or suggest a problem caused by the lack of random activity of a plurality of nerve fibers in an auditory nerve, let alone a particular signal or type of signals that are capable for causing "pseudospontaneous" activity or statistically independent activity in an auditory nerve.

2. With respect to claim 22, Applicants respectfully submit that Loeb does not teach or suggest generating a second signal, wherein the second signal includes at least fluctuations in the amplitude greater than a prescribed amount at a frequency above approximately 2 kHz.

Applicants respectfully submit that Loeb teaches converting sound to a corresponding data signal DATA, and providing only the power signal POWER on electrode(s) 26, 27 using the decoded data signal DATA. Further, Loeb discloses such type of stimulation where needed at a relatively fast rate would be 800 to 1,200 pulses per second for the data signal DATA. See column 14, lines 41-45 of Loeb. Such stimulation is described as a stimulus 1104, shown in

Figure 11 of the present specification. Thus, Applicants respectfully submit that the data signal DATA corresponding to sound in Loeb will not be in a frequency range or an inter pulse interval (IPI) as recited in claim 22. Further, Applicants respectfully submit that the application of the signal representing speech at 800 to 1200 pulses per second in Loeb would not result in pseudospontaneous activity in the auditory nerve nor would the carrier signal result in pseudospontaneous activity in the auditory nerve. Finally, Loeb does not teach or suggest any modification to its disclosure that would result in at least a feature of a second signal, wherein the second signal includes at least fluctuations in the amplitude greater than a prescribed amount at a frequency above approximately 2 kHz and combinations thereof as recited in claim 22.

Further, Applicants respectfully submit a carrier signal disclosed in Loeb is removed prior to determining a signal representing speech for application to an auditory nerve. The Office Action appears to assert that a modulated power signal being a carrier signal between 100 KHz and 50 MHz discloses a second signal capable of causing pseudospontaneous activity as recited in claim 1. See column 11, lines 9-16 and column 12, lines 1-15 in Loeb. See Item 2, first sentence citing carrier frequency *fn* on page 3 of the Office Action. However, the carrier signal is removed by the multi channel simulator of Loeb. Loeb discloses the micro-stimulator 20 includes a power supply and demodulator circuit 94 that filters out the carrier frequency signal and produces a power signal POWER, a data signal DATA and a clock signal CLOCK as shown in Figures 7A-8 of Loeb. See column 13, line 62-column 14, line 3 and column 15, lines 31-46.

The information modulated on the carrier frequency in Loeb is being used stimulate the auditory nerve. See column 15, lines 3-29 of Loeb.

Thus, Applicants respectfully submit that Loeb does not teach or suggest at least features of a second signal, wherein the second signal includes at least fluctuations in amplitude greater than a prescribed amount at a frequency above approximately 2 kHz and combinations thereof as recited in claim 22.

3. With respect to claim 1, Applicants respectfully submit that Loeb does not teach or suggest at least a feature of a signal generator that generates a second signal capable of causing pseudospontaneous activity in an auditory nerve, and a signal processor that combines a first signal that represents sound and the second signal to output a combined signal. Applicants respectfully submit that Loeb discloses the application of a single signal representative of speech to an auditory nerve. Thus, Applicants respectfully submit that Loeb teaches converting sound to a corresponding data signal DATA, and providing only the power signal POWER on electrode(s) 26, 27 for application to the auditory nerve according to the decoded data signal DATA and a clock signal CLOCK.

In contrast, Applicants respectfully submit preferred embodiments of the present invention teach applying a first signal representing sound, speech, information or the like and a second signal to generate pseudospontaneous activity in the auditory nerve. Thus, Applicants' preferred embodiments use two signals for application to the auditory nerve or for being combined into a signal applied to the auditory nerve. Applicants respectfully submit that Loeb

does not teach or suggest a first signal representing sound and a second signal capable of causing pseudospontaneous activity in an auditory nerve and combinations thereof as recited in claim 1.

Further, Applicants respectfully submit Loeb does not teach or suggest any modification to its disclosure that would result in first and second signals and combinations thereof as recited in claim 1. For at least reasons similar to claim 1, Applicants respectfully submit that claim 11 defines patentable subject matter.

4. For at least the reasons set forth above, Applicants respectfully submit claims 16 and 29 define patentable subject matter, claim 22 defines patentable subject matter and claims 1 and 11 define patentable subject matter. Claims 2-8, 12-13, 18-21, 23-28 and 30-31 depend from claims 1, 11, 16, 22 and 29, respectively, and therefore also define patentable subject matter for at least that reason as well as their additionally recited features. Withdrawal of the rejection of claims 1-8, 11-13, 16 and 18-31 under 35 U.S.C. §102 is respectfully requested.

C. The Office Action rejects claims 9-10, 15 and 17 under 35 U.S.C. §103(a) over Loeb. The rejection is respectfully traversed.

As described above, claim 1 defines patentable subject matter. Applicants respectfully submit that claims 11 and 16 define patentable subject matter for at least reasons similar to claim 1. Claims 9-10, 15 and 17 depend from claims 1, 11 and 16 respectively, and therefore also define patentable subject matter for at least that reason as well as their additionally recited

features. Withdrawal of the rejection of claims 9-10, 15 and 17 under 35 U.S.C. §103 is respectfully requested.

D. Applicants further respectfully submit that claims 4, 13, 18, 21, 26 and 30 variously recite at least a feature wherein the second signal has fluctuations in amplitude greater than a preferred amount at a frequency above approximately 2 kHz. Further, Applicants respectfully submit claims 4-5, 21, 24-26 and 30 variously recite wherein the pseudospontaneous activity is demonstrated by statistically independent activity in a plurality of nerve fibers in the auditory nerve. Thus, Applicants respectfully submit these dependent claims are patentable for at least their additionally recited features.

CONCLUSION

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. Favorable consideration and prompt allowance are earnestly solicited.

If the Examiner believes that any additional changes would place the application in better condition for allowance, the Examiner is invited to contact the undersigned attorney, **Carl R. Wesolowski**, at the telephone number listed below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper,

including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
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Enc: Petition for Extension of Time

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Date: September 30, 2002

Amended Claims With Mark-ups to Show Changes Made

22. (Amended) A neural prosthetic apparatus, comprising:

a signal generator that generates a second signal [capable of inducing a random pattern of activation in an auditory nerve];

a signal processor that combines a first signal that represents sound and the second signal to output a combined signal; and

stimulation unit coupled to the signal processor that receives the combined signal from the signal processor for application to the auditory nerve, wherein the second signal includes at least fluctuations in amplitude greater than a prescribed amount at a frequency above approximately 2 kHz.

24. (Amended) The apparatus according to claim 22, wherein the [random pattern of activation is demonstrated by] second signal generates statistically independent activity in a plurality of nerve fibers in the auditory nerve.

26. (Amended) The apparatus according to claim 22, wherein the second signal includes one of (i) a pulse train generating substantially continuous pseudospontaneous activity being statistically independent activity in a plurality of nerve fibers of the nerve, and (ii) a broad band noise[, and (iii) at least fluctuations in amplitude greater than prescribed amount at a

frequency above approximately 2k Hz] that causes statistically independent activity in [a] the plurality of nerve fibers of the nerve.